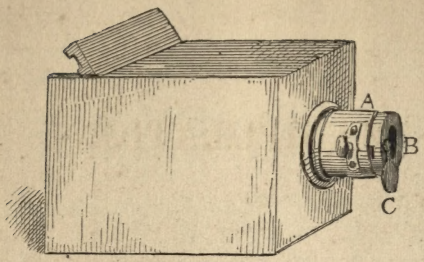


Fig. 1.

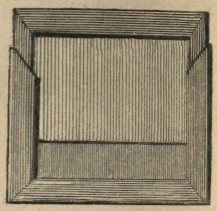


Fig. 2.

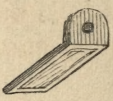


Fig. 4.

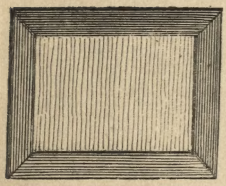


Fig. 3.

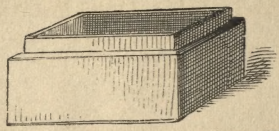
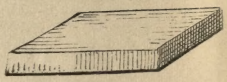


Fig. 5.



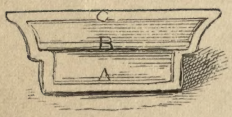


Fig. 6.

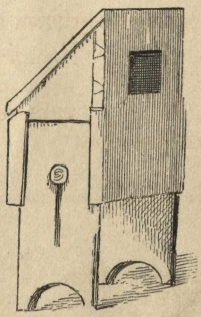


Fig. 7.

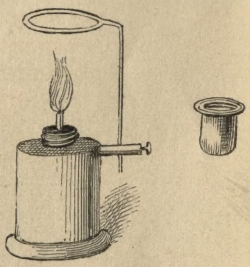


Fig. 8.

Fig. 9.

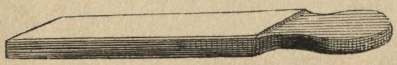


Fig. 10.

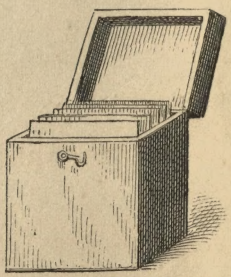


Fig. 11.

PHOTOGRAPHIC MANIPULATION;

CONTAINING

SIMPLE AND PRACTICAL DETAILS OF THE MOST IMPROVED PROCESSES

OF

PHOTOGENIC DRAWING,

THE

DAGUERREOTYPE AND CALOTYPE:

With a Concise Description of

CRYSTOTYPE. FERROTYPE.
ANTHOTYPE. FERRO-CYANOTYPE.
CYANOTYPE. THERMOGRAPHY.
TITHONOTYPE.

ILLUSTRATED WITH CUTS OF THE VARIOUS APPARATUS.

Second Edition.

[W. H. Thornthwaite]

PRICE 1*s.* 6*d.*

LONDON:
EDWARD PALMER, 103, NEWGATE STREET.
1843.

LONDON: COOK AND CO., PRINTERS,
76, FLEET STREET.

PREFACE.

The beautiful results of the Photographic Art have been sufficiently before the Public to have their peculiarities known and their merits appreciated; and the question naturally arises—How are they produced? To this question the Writer offers the present Pamphlet, in the hope that those who merely seek some slight information on this subject will have their wishes gratified by its perusal; and those who desire to follow out this art by experiment, may find sufficient detail to enable them to practise Photographic Drawing with success.

Being well aware that the contents of "Photographic Manipulation" cannot fail to afford abundant scope for criticism, the Writer, in conclusion, begs that it may be as lenient as possible, in consideration of its being a first literary attempt.

W. H. T. Thornthwaite

July, 1843.

DESCRIPTION OF THE CUTS.

Fig. 1, represents a very convenient camera for Photographic or Calotype Drawing; it consists of a mahogany box, in the front of which is fixed a brass sliding tube, A, having an achromatic glass at one end, and the diameter of the tube contracted in the front, forming what is called a stop, B. C, a small shutter for closing the aperture.

Fig 2, a sliding frame which fits the back of the camera; it has a piece of slate at one side for holding the prepared paper, and a sliding lid, which protects it from the light, at the other. There is also a small wooden frame, which fits the same groove as the piece of slate, and is used for holding the prepared plate in the Daguerreotype operation.

Fig. 3, a frame holding a piece of ground glass, which slides into the same groove at the back of the camera as the sliding frame, Fig. 2. It is used for ascertaining the focus, which is adjusted by the rack and sliding tube in the front of the camera.

Fig. 4, represents a small mirror capable of being fixed on the sliding tube A of the camera, by means of a screw. As all objects in the camera obscura appear reversed, that is, all right-hand objects will appear to the left, in the picture, and *vice versa*, it is of great importance, in many instances, to obtain the pictures as they appear in Nature; this is accomplished by the small reflecting mirror, which has the effect of reversing the objects in the camera, and thus rendering the

picture correct; when used, it must be turned towards the object to be copied till a perfect representation is observed on the ground glass.

When the mirror is employed, the time required to produce a picture is generally doubled.

Fig. 5. *The Iodine Box.*—It consists of a mahogany box lined with glass, with four projecting pieces of glass, near the top, for the corners of the plate to rest upon while being iodined. The box is either furnished with card* at the bottom, to be saturated with a solution of iodine when going to be used, and a plate of glass to lay over it to prevent useless evaporation, or a quantity of iodine is spread over the bottom and covered with one or two layers of cotton-wool, over which is placed a piece of card-board, capable of being reversed when required. When a plate is to be prepared, the side of the card, which is downwards, and, consequently, saturated with the vapour of the iodine, should have its position reversed, so that the evaporation from its surface may give an even coating to the plate. By this arrangement one surface of the card is always in a fit state for use, and will only require its position to be altered each time a trial is made.

While iodizing a plate, the box should be covered with its lid, as it prevents the possibility of any draft of air, which might prevent the plate from being equally coated over its surface.

It is hardly necessary to state that the iodine box, when not in use, should be kept covered with its lid, as that will not only keep the box in a proper state for use, but prevent waste.

Fig. 6, represents a section of the bromine apparatus, and is made of black, yellow, or red glass; A, the bottom division

* The card-board used should be black, or of a dark colour.

of the glass, where the solution of bromine is placed; B, shows the position of the plate resting by its corners over the solution; C, a plate of glass which fits air-tight over the apparatus.

Fig. 7. *The Mercury Box.*—The body is made of mahogany; at the bottom is an iron cup for holding the mercury. At one of its sides, and also in the front, is a small window of yellow glass, and on the under part of the lid is placed a slide of plate iron for holding the silver plate while being exposed to the fumes of mercury.

Fig. 8, a brass spirit-lamp for heating the mercury in the mercury box, furnished with a sliding ring of wire, very useful for supporting the silver plate over the flame of the lamp while fixing, &c.

Fig. 9. *Plate Cleaner.*—It consists of a small board, the size of the plate, mounted on a block of wood, which can be fastened to a table by means of a clamp; at one corner of the board is a small piece of brass, having a small hole in its upper part, just sufficient to hold the corner of the plate to be cleaned; at the opposite side there is another similar piece of brass, made to slide, that it may be adapted to the various sizes of the plates.

Fig. 10. *Velvet Buff.*—A piece of wood about fourteen inches long, and from three to four inches wide, evenly covered with three or four folds of well-washed white cotton velvet.

Fig. 11, represents a form of box very convenient for preserving Daguerreotype Plates after they are polished, or when prepared.

CONTENTS.

ON PHOTOGRAPHY.

CHAPTER I.

INTRODUCTION AND HISTORY.

LIGHT has always been esteemed, by every one who has an eye to see, or a mind to comprehend, as one of the most important agents in Nature; for whether we regard it as unfolding to our senses all those varied beauties of form or colour with which the face of Nature is adorned, or as acting a most important part in the production of those beauties, we cannot fail to be struck with its vast importance to our own comfort and enjoyment, and the wisdom and beneficence of HIM who commanded, and there was Light.

We cannot define *what Light is*, any more than our minds can comprehend our origin from nothing; but we are graciously permitted not

only to know and recognise light by its effects, but also, by observing those effects, to trace out the never-changing laws which govern them.

The observation of effects, with the endeavour to arrive at those first principal laws, is a most intellectual and useful pursuit, and constitutes Natural Philosophy; among the various departments of which, none, if we may be allowed comparison where all is beautiful, is more interesting than *Light*.

The observation of the nature and properties of Light, and the peculiar changes which it undergoes in its qualities or direction, when passing through bodies of different forms—when reflected from their surfaces—or when moving past them at small distances, constitutes the *Science of Optics*. The observation of the peculiar effect produced by Light on the constitution of some bodies, more particularly as regards obtaining impressions of objects by those effects, has received the name of PHOTOGRAPHY.

The word *Photography* is derived from two Greek words, Φῶς and γραφω, and is applied to the art of making pictures or impressions by the agency of Light.

Light has been known for a long time to produce other effects besides that of illuminating objects, and rendering them visible to our senses; such, for instance, as destroying the colour from some bodies and increasing it in others. These effects are caused by and have received the name of the "CHEMICAL ACTION OF LIGHT," in the same way that heat and the cause of heat are generally called by one and the same appellation.

The chemical action of light is either to cause bodies to combine together or to decompose them, and the decomposing effect of light being generally in proportion to the facility with which the same result may be produced by other means, it is one of the chief endeavours of the Photographist to discover and employ those compounds whose constituents are held together by the least possible degree of affinity.

The compounds of silver are those which are generally used for photogenic or photographic purposes, and they appear, as far as our present knowledge extends, to be the most influenced by the action of light, although it is extremely probable, from some late experiments of Sir J. Herschel, that there is not a compound, of whatever nature it may be, but is affected more or less

by light, and, although that effect may not, in many instances, be visible, still it may exist, and only require the article which has been exposed to its action to be placed under different circumstances, to make the effect apparent to our senses.

The darkening of recently precipitated chloride of silver, when exposed to the light, appears to have first suggested the idea of photographic drawing, and the earliest recorded experiments on this subject are those of Wedgwood and Sir H. Davy, which were published in the journal of the Royal Institution, in June, 1802; but as these philosophers were not able to prevent the further action of the light after an impression had been obtained, their experiments led to no conclusive result, and the subject was in a short time abandoned. M. Niepce, about the year 1814, appears to have been the next who turned his attention to the production of pictures by light: he continued his experiments alone for about ten years, when he became acquainted with M. Daguerre, who was also pursuing the same object. These two gentlemen continued their researches together, without publishing any of their results, till the beginning of the year 1839, when the discovery of *Daguerreotype* was announced; but the process was kept secret till the month of July in the same

year, when the French Government purchased the secret.

In January, 1839, Mr. Fox Talbot, who had been experimenting for a considerable time to render paper sensitive to light, communicated to the Royal Society his photographic discoveries, and shortly afterwards published the mode of preparing his sensitive paper, and the method of obtaining photogenic drawings from leaves, flowers, feathers, &c. To Mr. Fox Talbot is due the honour, not only of having first given to the world his beautiful process of photogenic drawing, but also the more recent discovery of the *Calotype*, by which objects may be obtained on paper, by means of the camera obscura, in a few seconds, and rivalling, in point of effect, the delicate outline of the Daguerreotype.

The photographic art is also greatly indebted to the interesting and valuable researches of Sir J. Herschel, who has invented and suggested many improvements in known processes, and likewise discovered the *Crysotype* and several other peculiar and beautiful modes of photogenic drawing. Among the many whose experiments have enriched this interesting subject, besides those already mentioned, the names of Fyfe, Hunt,

Ponton, Donne, Draper, Becquerell, and Redman, will be sufficient to show the attention and science that have been and are being devoted to perfect and simplify photography; but as we advance, wider appears the field, and more bright the prospect; and so fraught with interest and amusement is every department that has yet been explored, and so many still remain untouched, that we may anticipate results far greater than have yet transpired; and it may not be chimerical to imagine that the time is not far off when we shall be able faithfully to copy in a few seconds the beautiful varied forms and colours of animate and inanimate nature, whether in her sober guise or decked in her gaudiest dress.

Even in its present state, the art must be invaluable to the traveller, enabling him, with only a slight addition to his usual load, to obtain correct copies from Nature's self of all those objects of interest he may chance to meet. The botanist and naturalist are able to retain fac-similes of all those objects, whether flowers, leaves, trees, feathers, insects or animals of any description, that interest them the most; these copies, in general, not only retaining a correct outline, but sufficient detail to distinguish their distinctive characters. In fact, every one who either loves

to copy Nature in her outward form by art, or to observe and trace her in her more obscure walk of science, must feel interested and delighted, and endeavour, as far as he possibly can, to enrich, by his own observation or experiment, so valuable and interesting a discovery, where, strictly speaking, art and science go hand in hand.

CHAPTER II.

ON PHOTOGENIC DRAWING.

This simplest branch of photography appears to have been first suggested, as before mentioned, by Sir H. Davy, but was brought to apparent perfection by Mr. Fox Talbot in 1839, the principle of whose discovery was washing paper over with some preparation of silver that darkened in proportion to the intensity of light falling on its surface, and, when a sufficiently distinct image was produced, dissolving out the remainder of the silver preparation that had not been decomposed by the light, by which means a permanent impression was obtained.

The above is the principle upon which all the

various photogenic compounds act; above a hundred different modes and compounds are described in some works on this subject, but it is not the intention here to describe any but those processes which have generally been found the most successful.

SELECTION OF THE PAPER.

The kind of paper most recommended is that called blue wove-post, and those sheets should be selected which appear of an even texture throughout and free from spots; this is best ascertained by holding the sheets of paper before a lamp; each sheet should have a pencil-mark made on one side, that the surface which has to be prepared may be distinguished when required.

PREPARATION OF THE PAPER.

The only apparatus necessary for this purpose are, a few frames of wood similar to those used for slates, a little smaller than the sheets of paper to be prepared, two or three soft camel's-hair brushes, some sheets of white blotting paper, two or three glasses for holding the photogenic solutions, and one or two glass stirring rods. The chemical solutions required are, a quarter of an ounce of crystalized nitrate of silver dissolved in two ounces of water, and forty grains of common

salt, or muriate of ammonia, also dissolved in two ounces of water.

The paper to be prepared should be slightly damped by placing it for a short time between several folds of the blotting paper, previously wetted; a sheet should then be carefully pasted on one of the wooden frames, and allowed to dry; it may then be evenly washed over, by means of a camel's-hair brush, with the solution of nitrate of silver, taking care that the brush is used in one uniform direction over the sheet, removing it as seldom as possible, and avoiding the extreme edge of the paper pasted to the frame, which should not be wetted: the paper may then be allowed to dry in a dark place, and, when dry, washed over with the solution of muriate of soda or ammonia, observing the same precautions as recommended for applying the first solution of silver. When dry, the paper thus prepared may be cut out of the frame and kept for a considerable time, if preserved from the light, and as much as possible from the atmosphere.

MODE OF USING THE PHOTOGENIC PAPER.

This photogenic paper may be used for obtaining correct copies of all small objects, either of

nature or art, provided they are, or can be made, sufficiently flat, without injury; the objects best adapted for this purpose are plants, leaves, flowers, ferns, mosses, feathers, wings of insects, prints, drawings, lace, and other similar articles. The only apparatus necessary will be two pieces of plate-glass, the size of the drawing to be made, or a little larger, either separate or fixed in a hinged frame, so contrived that the two plates may be pressed together by means of a screw or weight, and a thin deal board, covered with two or three folds of flannel. To copy objects that are flat, such as prints, drawings, &c., proceed as follows:—Place a sheet of the photogenic paper on one of the pieces of plate-glass, taking care that the prepared side, which is easily distinguished by the mark made for that purpose, is upwards. The print, or drawing, should then be placed on the paper, printed side downwards, and the other piece of plate-glass placed so as to press them into close contact. The whole may then be exposed to the light, the drawing to be copied being upwards.

The time required to produce an impression depends, in a great measure, upon the thickness of the paper upon which the print or drawing is made; about ten minutes in a bright sunshine, or half an hour in clear daylight, is generally suf-

ficient; but the best method is to gently slide the upper glass partially off without disturbing the position of the print or drawing, and by carefully lifting that part which is uncovered by the glass, see whether the impression is complete; if not sufficiently dark, return the glass to its place, and expose it some time longer to the action of the light, till the copy be sufficiently distinct.

To copy objects that are not flat, such as plants, leaves, butterflies, &c. &c., proceed as just described, but interpose between the lower glass and the prepared paper, which should be slightly damped, the board covered with flannel, and apply a moderate pressure to the upper glass, by which means the object will be slightly embedded in the sensitive paper, and a very beautiful and correct impression obtained.

If the object be very unequal in its thickness at certain points, those parts may, in most cases, be reduced by means of a penknife, without impairing, in the slightest degree, the accuracy or effect of the copy.

There are many ways of modifying the process for obtaining photogenic drawings from various substances and articles which cannot fail to occur

to the experimenter, and, therefore, need not be particularly described; such, for instance, as covering a piece of glass with a coating of some opaque substance, as a mixture of lamp-black and varnish, and tracing a subject through it with a point. If the glass thus prepared be then laid on a sheet of photogenic paper, and exposed to the light, an impression will be obtained somewhat similar in appearance to a line engraving, or pen and ink drawing.

FIXING THE PHOTOGENIC DRAWINGS.

When an impression has been obtained by any of the means just described, it is necessary, for its preservation, that the undecomposed salt of silver remaining in the paper be removed.

The best article for this purpose is the salt called hypo-sulphite of soda, one ounce of which is to be dissolved in one pint of water. This solution, when going to be used, should be poured into a flat dish of sufficient size to contain the photogenic drawing to be fixed.

Immediately after a drawing has been obtained, it should be washed in plain water, and partially dried between some folds of blotting-paper; it ought then to be laid into the solution

of hypo-sulphite of soda for three or four minutes, and afterwards well washed in separate portions of water till the water comes off tasteless; the picture is now perfectly fixed, and may be dried and exposed to the light without any risk of injury.

The *rationale* of this fixing process is this. The chloride of silver, which is the result of the preparation of the paper, is very soluble in hypo-sulphite of soda; whereas, the oxide of silver reduced by the light is not; the consequence is, that when the photogenic impression is placed in the hypo-sulphite, all the undecomposed chloride of silver is converted into hypo-sulphite of silver, which, being very soluble in water, is removed by the subsequent washing.

The hypo-sulphite of silver having a very sweet taste, which it communicates to a large quantity of water, affords the best criterion for judging when the paper has been sufficiently washed in the fixing process just described.

ON NEGATIVE AND POSITIVE PHOTOGRAPHS.

A photographic impression obtained by the ordinary photogenic paper will, of course, have the lights and shades reversed in regard to the

original, *i. e.* the light parts of the original will allow the light to pass through, and produce shades on the paper, whereas those parts which are thick or opaque, by obstructing the light, will remain white, or nearly so. These kind of impressions are called *negative* ones, in distinction to those pictures where the lights and shades are as in Nature, when they are called *positive* photographs.

A photogenic copy of a print, for example, will, in the first instance, be a negative one; and in order to obtain a positive picture, or correct copy of the original, it must be reversed. This can be done by exactly the same means as were used for obtaining it in the first instance, only substituting the negative drawing for the print. In this way any number of positive copies may be obtained from one negative picture.

CHAPTER III.

DAGUERREOTYPE.

THE Daguerreotype is a process by which correct copies of objects can be made from Nature on

polished surfaces of silver. It derives its appellation from its inventor, M. Daguerre, an ingenious French artist, who published the process in August, 1839, for which he, together with M. Niepce, who assisted him in his investigations, received the grant of an annuity from the French government.

The process has been patented in England by Mr. Berry, in 1839, and in his specification is called "A New and Improved Method of obtaining the spontaneous reproductions of all the images received in the focus of the Camera Obscura;" since which time it has been greatly improved, and still is improving in many particulars, especially as regards its simplicity, and quickness of action.

DESCRIPTION OF THE PROCESS.

Daguerreotype Pictures, as they are called, are taken on copper-plates, covered with a coating of silver, which should be as pure as possible, and of sufficient thickness to allow of its being very finely polished. A superior description of Sheffield plate is the kind generally used, which, after being cut to the sizes required, is flattened or planished by the hammer, and afterwards polished on a lathe to the required surface. These plates,

properly prepared, and cut to any size, can be obtained ready for use.

The most improved method of proceeding consists of five distinct operations, viz.—

1. Cleaning the silvered plate.
2. Rendering its surface sensitive to light, by exposing it to the vapour of iodine, bromine, or their combinations with chlorine, &c.
3. Exposing the prepared sensitive plate to the focus of either a refracting or reflecting camera.
4. Bringing out the picture by exposing it to the vapour of mercury.
5. Setting the picture, by removing the sensitive surface of the plate which has not been acted upon by the light.

1. *Cleaning the Silvered Plate.*—The object in this operation being to obtain a surface of silver perfectly pure and polished, it is of the greatest consequence that the articles used in the latter part of the process should be free from grease, or any other substance of an oily nature. It is also advisable that the plates be not pre-

pared in any place where vapours may exist, arising from acids, volatile oils, &c.: as regards the importance of attending to this suggestion it may be noticed, that a small quantity of oil of turpentine having been used in a room where some Daguerreotype plates were afterwards polished, prevented any good pictures being obtained till its odour had entirely disappeared. Many ways and substances have been proposed for giving the best surface and polish, but the following can be recommended for its simplicity, and the good result obtained.

The articles necessary for this operation are,

Cotton wool.
Calcined tripoli.
Prepared lamp black.
Olive oil.
Nitric acid diluted with about sixteen parts by measure of water.
Spirit-lamp and stand.
Pair of plyers.
Cotton velvet buff.

The cotton wool should be clean and free from any greasy substance, and if any difficulty is experienced in obtaining it so, it is best to prepare it by soaking for about an hour in a rather weak solution of ammonia (hartshorn), and, after thoroughly

washing in clean water, allowing it to dry before the fire, or in a moderately heated oven.

The calcined tripoli, which should be in the state of an impalpable powder, is best kept for use tied up in a small muslin bag, and protected from dust in a wood or paper-box.

The lampblack should be prepared by making it red hot, in a crucible, till vapours cease to arise from it; the crucible should then be removed from the fire, closely covered up and allowed to get cold. The lampblack thus burnt should be reduced to a fine powder in a glass or porcelain mortar, and a portion tied up, like the tripoli, in a small bag of very fine muslin.

The mode of proceeding is as follows. Lay the plate, silver-side upwards, upon a piece of clean white paper, or, what is more convenient and better, on the plate holder (see list of apparatus), and shake a small quantity of the tripoli over it; a few drops of olive oil should then be applied, and with a knot of the cotton and a light hand proceed to polish the plate by a series of circular movements equally over its surface, adding more tripoli as required. The time usually expended for producing a good surface on a new plate is about five

minutes. If the plate be one that has been used, it should be heated over a spirit-lamp for a short time before beginning to polish; when a good surface is obtained, take a fresh pledget of wool, and, shaking more tripoli over the plate, gradually wipe off the oil, using a fresh piece of cotton as required: when the whole of the oil is apparently removed, the plate ought to be heated over a spirit-lamp till small white spots are observed to form on the surface; it may then be allowed to cool; when cold, apply, by means of a piece of cotton-wool, a few drops of the dilute nitric acid over the plate, which will immediately indicate if it has been sufficiently heated by its flowing easily over its surface, without running into distinct globules, which it would otherwise do; if the acid wets the surface easily, dust a little tripoli over it, and with a fresh piece of cotton-wool dry the acid off in the same manner as you did the oil: if the acid does not adhere to the plate, it will require to be rubbed with the tripoli for a little longer time before drying it off.

If the plate to be polished be very free from scratches or other blemishes, the use of the oil can be dispensed with, and the dilute nitric acid and tripoli alone used.

For giving the plate its final polish, dust a little

of the prepared lampblack on the velvet rubber, and briskly polish, holding the plate, if a small one, on the ends of the fingers of the left hand, and using the buff with the right; if a large plate, place it face downwards on the rubber, moving the plate up and down by means of the fingers, with a slight degree of pressure, taking care that for portraits the movement should not be in the direction of the face, but across it; and for views, in the direction of the view; and it is also best for this last polish to be given in a rather dark room, or by the light of a candle, as the clear daylight affects the bright surface of the silver, injuring its sensibility.

Applying the Sensitive Coating.—When the plate is well polished it will appear perfectly black, on looking at it in a certain angle; and just before proceeding to expose it to the fumes of iodine, be careful to remove every particle of dust or tripoli from its surface by a piece of the prepared wool, or a very soft camel's-hair brush; if this is not attended to, a number of black specks will be seen on the plate when iodined.

The operation of iodizing divides itself into two parts. 1st. Iodizing, properly so called. 2nd. Exposure to the vapour of chloride of iodine, bromide of iodine, or bromine.

1st. *Iodizing.*—This is accomplished in the best manner by an apparatus called the iodine box, described in *list of apparatus.* If the first form is used, a small quantity of a solution of half an ounce of pure iodine, in about an ounce and a half of sulphuric ether, should be poured over the card at the bottom of the box, and spread evenly over its surface with a soft brush: in a few seconds the ether evaporates, leaving a coating of iodine. If not used immediately, the plate of glass placed over the card will, in a great measure, prevent the useless evaporation of the iodine.

To iodine the plate, remove the lid and plate of glass, and place it face downwards on the ledge for that purpose, on the top of the box; in about a minute or two, according to the temperature, the plate will become of a fine orange yellow colour; it is as well to examine it several times during this operation, to see that the iodine is spreading evenly over its surface, as it will sometimes happen that the evaporation will proceed more rapidly from one part than another; in this case the plate should have its position altered from time to time, that an even coating may be obtained over its surface.

This operation is best done in a dark room, by

the light of a candle; but if any difficulty be experienced in getting the proper colour on the plate, it can be done in a room not having a direct, but diffused light; as, for instance, a room having the window-shutters closed and the door opened, just sufficiently to allow you to see. The colour of the plate is observed by holding a sheet of white paper in such a position, that its reflection may be seen on the plate, which will enable you to judge of the progress of the operation: if not sufficiently coloured, return the plate immediately to the iodine box till the proper tint be obtained. The plate thus prepared should be shut up in a dark box till wanted for use, when it must be subjected to the next operation, viz.—

2. *Exposure to the Vapours of Chloride of Iodine, Bromide of Iodine, or Bromine.*—All of these articles, separately, and their compounds, have been recommended at different times by various persons, for giving to the plate its greatest degree of sensibility; but the most simple and effective compound, according to the latest experiments on the subject, appears to be "bromide of iodine," which is prepared for the purpose in the following way:—Dissolve one drachm of iodine in four ounces of alcohol, and add to it about one

ounce and a half of a saturated aqueous solution of bromine,* or till the mixture becomes of a fine red colour. The bromide of iodine thus prepared can be kept in a stoppered bottle till wanted for use.

When a plate is about to be prepared, two drachms of the bromide should be mixed with eight ounces of water,† and this solution, when used, should be poured into the *bromine glass* till it occupies about two-thirds of the depth of the lower division, taking care that as small a portion of the glass above the level of the liquid be wetted by it as possible, as that tends to give an unequal coating to the plate.

The silver plate iodined of a clear yellow colour, as described under iodizing the plate, should be placed (face downwards) over the bromine glass, just resting on the ledge for that purpose. The plate should remain exposed to the bromine vapour from one to five minutes, or till its surface becomes

* If the pure bromine be preserved in rather a large bottle, and the bottle kept filled with distilled water, the proper saturated solution of bromine will always be ready for use.

† Sometimes, when the bromide is mixed with the water, a precipitation of a black powder takes place; if this should happen, a few drops of the solution of bromine should be added to restore its transparency.

of a decided rose tint, taking care to notice the exact time requisite to produce that effect. The plate may then be returned to the dark-box, and is ready to be exposed to the luminous rays in the camera.

Great care should be taken in observing the colour of the plate while being exposed to the bromide, as the plate gradually becomes exceedingly sensitive to the action of light, till it reaches a decided rose tint bordering on purple; after which it rapidly deteriorates in sensibility. The light, even of a candle, should not be allowed to fall direct while observing its colour, which should be done as quickly as possible, and in the same manner as described under *Iodizing the Plate.*

It will often happen that the picture, when finished, appears as if it had a film over its surface; this can generally be avoided in the subsequent trials, by leaving the plate exposed to the bromine for the exact time you noticed was requisite to produce the proper colour in the first experiment, and, the instant the time is expired, place it in the dark box, by which means you prevent the possibility of any light falling on its surface.

3. *Exposing the Prepared Plate to the focus of*

a Refracting or Reflecting Camera.—The mode in which this is effected must, of course, depend upon the construction of the camera, whether it have a lens, as originally proposed by Daguerre, or a concave mirror or speculum, which is the apparatus patented in this country by Mr. Beard; both kinds have their advantages. The refracting camera as recently improved (see list of apparatus) appears to possess all the capabilities without many of those inconveniences which attend on the manipulation with the reflecting camera, and being withal less expensive, is now the form generally used.

The first thing to be attended to before introducing the plate, is to place the camera on some firm support, and opposite to the object wished to be copied, after which the focus should be adjusted with the greatest care till a perfectly clear and distinct image of the object is seen on the piece of ground-glass, which should be placed in exactly the same position as the plate is to occupy, taking especial care that the ground-side of the glass should correspond to the prepared surface of the plate; when the focus is obtained, the light should be shut off by a contrivance for that purpose till the plate is introduced, or the camera may be taken into a dark-room and have

the plate put into its place, when it can be brought into the light, having, of course, made those obvious arrangements that the object and the camera be placed in precisely the same relative positions they occupied when the focus was adjusted.

The camera may then be opened to allow the light to fall on the plate through the lens. The time requisite for it to remain open will depend, in a great measure, upon the season of the year, time of the day, and the brightness or clearness of the atmosphere. The time usually required with a good achromatic, and well constructed camera, varies from one to sixty seconds.

When the camera has been opened a sufficient time, which can only be determined by observation and experiment, close the front aperture and take it into the dark room, when the picture, which is impressed on the sensitive surface of the plate, is to be made visible by being exposed to the fumes of mercury.

4. *Mercurializing the Plate.*—The apparatus required for this operation is called a mercury-box, and is used as follows:—Pour a small quantity of pure mercury (four to six ounces) into the

metal cup at the bottom of the box; the mercury should then be heated by means of a spirit-lamp till you can just bear to touch the metal cup outside. The plate may be taken out of the camera and placed in the mercury-box, and, after a short time, by cautiously applying a lighted taper to the side, and looking through the coloured glass in front, you will be able to see how the picture is progressing.

If the mercury be made very hot, the picture soon makes its appearance; but, generally speaking, when done too rapidly, the minor details are lost, and the plate is apt to become spotty; it is always advisable, where time is not a great object, to do the operation rather slowly than otherwise, as a much clearer and sharper outline of the picture will be obtained by this means than if done rapidly. The usual time required is from five to twenty minutes.

5. *Setting the Picture.*—When the plate has remained long enough in the mercury box, or till the picture has become sufficiently distinct, it should be first placed in a vessel of boiled or distilled water, and afterwards in the following mixture:—hyposulphite soda one ounce, alcohol two ounces, distilled water ten ounces.

The hyposulphite should first be dissolved in the water, then add the alcohol, shaking the bottle to facilitate the mixture.

It is not absolutely necessary that the plate be immersed in this solution, as a small quantity poured on its surface will have the desired effect.

When the sensitive coating is all removed, the plate should be well washed in water perfectly free from dust, and the picture may then be dried over a spirit-lamp, and the whole of the operation is completed.

The best method of drying the plate is to hold one of its sides with a small pair of plyers, letting one corner be downwards; the moisture will flow to that part, and by touching it with a piece of rag or blotting paper, the greater portion will be removed. The spirit-lamp should then be applied to the upper corner of the plate till it begins to dry, and the flame gradually brought lower down, till the whole surface is finished. Gently blowing downwards on the plate will expedite the process, as well as prevent, in a great measure, the formation of spots; if these should appear, the plate must be washed and dried over again.

The Daguerreotype Picture thus produced

ought to be kept protected from dust or anything touching the surface, as the least friction would destroy the impression. The simplest plan for this purpose is the following:—procure a piece of card or Bristol board, and a piece of flat glass, both the exact size of the plate; with a sharp penknife cut out the centre of the card, the size you wish the picture to be, place the rim on the surface of the plate, and put the piece of glass on it; a narrow slip of paper may then be pasted round the edge so as to unite the two, and prevent them from shifting their position. The picture by this means can be preserved for any length of time from dust and friction, the piece of interposed card preventing the glass from touching the face of the plate.

All Daguerreotype Pictures finished as just described, are very liable to accident, inasmuch as the difference of light and shade is entirely dependant on the adhesion of *minute globules of metallic mercury*, which attach themselves in a greater or less quantity according to the varied intensity of the glare of light constituting the picture. To cause these globules to attach themselves more strongly to the plate, or combining them with some other metal, would, of course, have the effect of fixing and rendering these

Daguerreotype impressions more permanent and less liable to injury.

Various methods have been proposed for this purpose. The best appears to be that invented by M. Fizeau, which not only perfectly fixes the picture, so that it can be gently rubbed without any injury, but also greatly increases the general effect, preventing, in a great measure, the unpleasant metallic reflection, and the necessity of viewing them in a particular light. The process as described by M. Fizeau is as follows:—

"Dissolve sixteen grains of chloride of gold and thirty-seven grains of hyposulphite of soda, each in two pints of distilled water, pour the solution of gold into that of the soda, a little by little, agitating between each addition. The mixture at first slightly yellow, becomes afterwards perfectly limpid. This liquid now contains a double hyposulphite of soda and gold.

"To use this salt of gold, the surface of the plate should be perfectly free from any foreign substance, especially dust; consequently it ought to be washed with some precautions, which might be neglected if it was to be finished by the ordinary mode of washing.

"The following manner generally succeeds the best: the plate being yet iodized, and perfectly free from grease on its two surfaces and sides, should have some drops of alcohol poured on the iodized surface;* when the alcohol has wetted all the surface, plunge the plate into a basin of water, and after that into a solution of hyposulphite of soda.

"This solution ought to be changed for each experiment, and to consist of about one part of the salt to fifteen of water: the rest of the washing is done in the ordinary way, only taking care that the water should be as free as possible from dust.

"The use of the alcohol is simply to make the water adhere perfectly all over the surface of the plate, and prevent it from quitting the sides at each separate immersion, which would infallibly produce stains.

"When a picture has been washed with these precautions, the treatment with the salt of gold is very simple. It is sufficient to place the plate on

* The alcohol used should be the strongest that can be procured. The ordinary alcohol being very liable to produce stains.

a support,* and pour upon its surface a sufficient quantity of the salt of gold, that it may be entirely covered, and heat it with a strong spirit-lamp; the picture will be seen to brighten, and become, in a minute or two, of great force. When this effect is produced, the liquid should be poured off and the plate washed and dried.

"In this operation, the silver is dissolved, and the gold precipitated upon the silver and mercury, but with very different results; in effect, the silver which, by its reflection, forms the shades of the picture, is some way darkened by the thin film of gold which covers it, from which results a strengthening on all the darks. The mercury, on the contrary, which, in the state of an infinite number of small globules, forms the lights, is augmented, in its solidity and brightness, by its union with the gold; from which results a great degree of permanency, and a remarkable increase in the lights of the picture."

When a plate is finished by M. Fizeau's process, just described, it can be kept in a portfolio, and easily cleaned with a soft camel's-hair pencil; and if an endeavour is made to remove the design

* See description of apparatus, page 7.

with the finger, it can be done but imperfectly and with difficulty. If the picture will not resist this trial on the edge of the plate, the operation ought to be repeated.

It sometimes happens that while the plate is being heated, a film of silver detatches itself and swims in the liquid, of course destroying part of the picture. This accident is probably owing to the oxidation of the silver while under the influence of too much heat.

The lamp should be removed as soon as small bubbles of air appear to form on the surface of the metal. When the picture is not perfectly fixed, it is better to go through the operation a second time, rather than run the risk of spoiling a good picture by trying to fix it perfectly the first time.

CHAPTER IV.

THE CALOTYPE.

THE word *Calotype* is derived from two Greek words, signifying "beautiful picture, or image." The Calotype process for taking pictures on paper,

has been patented in this country by Mr. Fox Talbot, in whose specification it was first described; it differs, in one respect, from all the former photogenic processes, inasmuch as the image formed on the Calotype paper is quite invisible when taken from the camera, until washed over with a liquid containing gallic acid, when the picture gradually appears in all its details. In this particular the beautiful process bears a remarkable analogy to the Daguerreotype.

The first difficulty the Calotypist has to contend with, is to obtain a paper of sufficiently fine and even texture, and perfectly free from all foreign matter in its substance, which would cause blemishes in the picture.—The best kind of paper is that called blue wove, or bank post, and each sheet, preparatory to its being used, should be carefully examined before a strong light, and those sheets rejected in which any spots or uneven texture is observed. When a sufficient quantity of paper has been selected, and evenly cut to the required size, it should be kept clean and free from grease till a convenient time for its preparation.

The following is an outline of the Calotype process, as described by Mr. Fox Talbot in his

specification, with some slight modifications suggested by Mr. Mitchel, Dr. Ryan, and others.

PREPARATION OF THE PAPER.

The articles required for the first part of the operation are :—two drachms of crystalized nitrate of silver, dissolved in six ounces of distilled water; and two drachms and a half of iodide of pottassium, dissolved in one pint of distilled water. The mode of proceeding is as follows :—

Fasten the sheet of paper, by its corners, on a smooth board, by four small pegs of wood, or, what is better, small pins of silver wire, and wash it on the upper side with a solution of iodide of potassium by means of a soft camel's-hair brush: when the paper appears to be thoroughly wetted, allow the superfluous solution to drain from it for a few minutes, and set it aside, protected from dust, till perfectly dry ; if time is an object it may be dried before a gentle fire,—then wash the paper thus prepared on the same side as before, evenly, with the solution of nitrate of silver, and dry it again with the same precaution ; when dry, it may be removed from the board and dipped, for about half a minute, in the solution of iodide of potassium, which, for this purpose, should be poured into a flat dish, of sufficient size to contain the sheet of paper; when removed from this solution, it should

be finished by being washed in distilled water;* this washing process is most conveniently done by holding the sheet of paper by two of its corners, and moving it briskly to and fro in the water, which should be contained in a suitable vessel (a deep pie-dish answers the purpose exceedingly well); when well washed, dry it lightly between some folds of white blotting paper, then fasten it again on the piece of board and allow it to dry spontaneously in a drawer, or other dark place, free from dust.

The paper so far prepared is called iodized paper, and, although scarcely affected by light, it is always advisable to perform the process just described by candle-light, which has a very slight decomposing effect, and, therefore, least likely to spoil the paper.

The manipulation of producing the iodized paper may appear, at first sight, very tedious and operose, but as the whole success of the operation mainly depends upon obtaining an even distribution of the iodide of silver, which is the result of the combination of the two mixtures used on the paper, a careful attention to the different details

* If a sufficient quantity of distilled water cannot be obtained, rain or pump water, well boiled, allowed to settle and get perfectly cold, will answer every purpose.

of the process will be amply repaid by the success which cannot fail to attend it.

The iodized paper, when well made, should appear of a clear, light, primrose colour, and of an even tint all over that side which has been prepared: it may be kept unchanged for any length of time in a portfolio, or between the leaves of a book, so as to be protected from the light.

The second part of the process, which renders the paper so exceedingly sensitive to light, is best performed a short time before the paper is to be used. The two solutions required for this part of the operation are—1st. Two drachms of crystalized nitrate of silver dissolved in two ounces of distilled water, to which should be added half an ounce of crystalizable acetic acid.* 2nd. Fifty grains of crystalized gallic acid dissolved in about eight ounces of distilled water; these solutions ought to be kept in separate stopped phials, and used in the following manner:—Mix a small quantity (say half a drachm) of the solution of nitrate of silver with an equal quantity of the solution of gallic acid:

* The acid ought to be as pure as possible, the strong pyroligneous, or acetic acid, commonly sold in the shops, should not be used, as it is very apt to produce stains on the paper immediately it is applied.

this mixture is called, for the sake of distinction, "gallo-nitrate of silver;" it will not keep long, and therefore should be used as soon as possible after making. Having placed a sheet of the iodized paper upon the board or slate that fits the back of the camera, wash the prepared side, by means of a soft camel's-hair brush, with the gallo-nitrate of silver; allow it to remain for about half a minute, then dip it into some distilled water, and afterwards lightly dry it between some folds of blotting-paper; it may then be placed upon the slate, and is ready to be put into the camera.

The dampness of the paper will make it adhere sufficiently to the slate or board to prevent the necessity of any other fastening.

Having previously adjusted the focus of the camera, insert the slate, holding the paper, in its place, and allow the focus to fall on it. The time requisite to produce an impression in a great measure depends upon the brightness of the object, and the clearness of the atmosphere; from fifteen seconds to two minutes is generally sufficient.

When the paper is removed, after exposure for a sufficient time in the camera, little or no image will be seen; the hidden impression, however, can

be brought out by washing as before with the gallo-nitrate of silver, and slightly warming it. This is most conveniently done by laying the paper on a flat tin or pewter vessel made for the purpose, and filled with hot water; or, if this apparatus is not at hand, a flat earthen or glass bottle filled with hot water, will answer every purpose; after the lapse of a minute or so, if the trial has been successful, the picture will be seen to unfold itself in all its details in a most beautiful and extraordinary manner; those parts of the picture, where the light has acted strongly, becoming dark, while the other parts, corresponding to the shades of the object, remain white, or nearly so.

When the picture appears sufficiently distinct, it should be removed from the source of heat and set, by dipping it into some distilled water, after that, into a solution of half an ounce of bromide of potassium in one pint of distilled water, in which it should remain about half a minute; when removed from this solution it should be again washed in distilled water and dried.

The whole of this part of the process should be conducted in a room from which the light of day is excluded; the only light used should be that of a candle or small lamp, surrounded with a shade of

yellow glass, which has been found to prevent any decomposing effect on the sensitive paper.

The Calotype picture thus formed may be exposed to light without injury; but the process producing a negative impression, as it is called, that is, the lights of the object copied being represented by shades, and *vice versâ*, it is necessary, to obtain a correct picture, to reverse it on some common photogenic paper, by the same means as before described for copying prints (see p. 10).

If the Calotype impression is not found to be transparent enough, a small quantity of olive oil rubbed over it, or, what is better, a portion of white wax scraped over its surface, and then placed on a hot iron, will make it sufficiently transparent to obtain as many photogenic pictures from it as may be required.

Should the object copied on the Calotype paper be a portrait, or bust, it is a very excellent plan to cut the impression cleanly out with a sharp penknife or scissors, carefully following the outline of the picture; the impression should then be laid on the photogenic paper, and copied in the usual way, by which means the reverse will have the bust or portrait shown with much greater distinctness and effect than if done by the ordinary method.

Should the Calotype pictures, by constant exposure to light, lose their sharpness and detail, washing them over again with the gallo-nitrate of silver, and heating them, will restore their former distinctness.

This Calotype paper is so exceedingly sensitive to the influence of light, that very beautiful photogenic copies of lace, feathers, leaves, and such like articles, may be made by the light of a common coal gas flame, or an Argand lamp. The mode of proceeding is precisely that described for obtaining the ordinary photogenic drawings by daylight, only substituting the Calotype paper, which should be damp, for the common photogenic.

When exposing the prepared paper to the light, it should be held about four or five inches from the flame, and the time required will be about three minutes.

CHAPTER V.

CRYSOTYPE.

This variety of photogenic drawing was discovered by Sir J. Herschel, and derives the name from *χρυσος*, gold, *τυπος*, a picture. The process is

as follows:—wash the paper, to be prepared evenly on one side with a solution of ammonio-citrate of iron in distilled water. This solution should be recently prepared, and of an amber colour. The paper will now be ready for use, and being, in the usual way, exposed to the light, the impression must be brought out by immersing it in a solution of chloride of gold, rendered neutral by carbonate of soda. The picture should then be well washed in water and dried.

ANTHOTYPE.

It has been discovered, also, by Sir J. Herschel, that the expressed juice, alcholic or watery infusions of the petals of the wild poppy, double stock, rose, guiacum, and several other plants, are affected by the action of light, which generally destroys their colour; if paper, therefore, be washed over and used as the ordinary photogenic paper, the result will be a positive picture of the same colour as the infusion, or expressed juice of the flower used. This process, which has been called, by its discoverer, "Anthotype," is very interesting, as it shows that the vital principle of plants prevents those changes of colour and properties which immediately take place when that influence is destroyed.

CYANOTYPE, OR FERROTYPE.

This is a similar process to the crysotype, bringing out the picture with a solution of the ferro-cyanate of potass instead of the solution of gold. The result is a positive picture of a blue colour on a yellowish green ground. This process, which is a very delicate one, was also discovered by Sir J. Herschel, and is named from the circumstance that the combination of cyanogen and iron acts an important part in the operation.

FERRO-CYANOTYPE.

This exceedingly sensitive photographic process was discovered by Mr. R. Hunt, of Falmouth, and is thus described in the "Chemist" of last September.

"Highly glazed letter-paper is washed over with a solution of one drachm of nitrate of silver to an ounce of distilled water; it is quickly dried, and a second time washed with the same solution. It is then placed for a minute in a solution of one drachm of hydriodate of potass in six ounces of water; and being placed on a smooth board, gently washed, by allowing pure water to flow over it, it is dried in the dark at common temperatures. Papers thus prepared may be kept for any length of time, and are, at a moment, rendered far more sensitive than any known photo-

graphic preparation, except the calotype, to which it is quite equal, by simply washing it over with a solution formed of one drachm of the ferro-cyanate of potass to an ounce of water. These papers may be washed with the ferro-cyanate, and dried in the dark: in this dry state they are absolutely insensible, but they may at any moment be rendered sensitive by merely washing with cold water. The paper is rendered quite insensible by being washed over with the above solution, and from the photograph thus fixed many copies may be taken."

THERMOGRAPHY.

If a copper coin be laid on a polished silver plate, and the plate be then slightly heated and allowed to cool, an impression will be formed of the coin on its surface, which will become perfectly visible on breathing over the plate. The figure will remain for many days, only requiring to be breathed on, for it to become visible, and if the plate be exposed to the vapour of mercury the impression becomes permanent.

Almost any substance laid upon a polished surface of metal or glass, slightly warmed, will give an impression when breathed on. The sharpness and clearness of which varies with the articles employed. A coin, for instance, merely laid, and allowed to remain on a looking-glass a

few minutes, and breathed over two or three times, will, on the coin being removed, show its figure for several weeks by merely breathing on the surface of the glass, provided it be not rubbed during that time, which would destroy the impression.

The cause of these results is not known, but the discoverer, Mr. Hunt, has designated this peculiar impression by the name Thermography, derived from θερμος heat, and γσαφω, to write, from the circumstance that heat appears necessary for this production.

CHAPTER VI.

MULTIPLICATION OF DAGUERREOTYPE PICTURES.

After the foregoing pages were printed, the following ingenious mode for copying Daguerreotypes was obligingly communicated to the author by its inventor, Mr. George Edwards.

Procure some sheets of black paper, and brush them evenly over on one side with a rather strong solution of isinglass, or Nelson's gelatine; the sheets of paper ought then to be dried and kept ready for use between the leaves of a book, or in a portfolio. When a Daguerreotype is to be copied, let one of the sheets of paper be placed in some cold water, till the gelatine on its surface becomes soft;

it should then be carefully laid on the silver plate, and after first placing several folds of blotting paper, and then a smooth board on the back of the black paper, subject the whole to a moderate pressure till dry. The paper, on being removed from the plate, will present a perfect representation of the original.

A modification of this process was invented by Dr. Draper, who has given it the name of *Tithonotype*. The substance of the following description is taken from the "Phil. Mag.," May, 1843:—

"The Daguerreotype intended to be copied is to be covered with a thin film of gold, in the usual way (Fizeau's), care being taken that the film is neither too thick nor too thin.

"A clear solution of isinglass is next to be prepared, and of such a consistency that a drop of it placed on a cold metallic plate will speedily solidify.

"This is to be particularly attended to, as much of the success of the operation depends on this solution being properly prepared.

"The Daguerreotype is to be supported with its face upwards, in a current of hot air rising from a stove; and whilst thus situated, the isinglass is to be poured on it, until a stratum of about one-sixth of an inch has accumulated. It is then suffered to dry; the whole process occupying two or three hours. When successful, the film of isinglass, now indurated, peels off, and will be found to bear a minute copy of the original, and can be examined either by reflected or transmitted light."

PHOTOGRAPHIC APPARATUS,

CHEMICALS, &c.

MANUFACTURED AND SOLD BY

EDWARD PALMER,

Philosophical Instrument Maker, &c.

103, NEWGATE STREET, LONDON.

	£.	s.	d.
Small Photographic Camera, with sliding tube	1	1	0
Ditto, improved, with Achromatic Lens	1	15	0
Ditto, with Rackwork Adjustment .	2	10	0
Ditto, with Chemicals . .	3	3	0
Second Size Photographic Camera, with Achromatic Lens . . .	3	3	0
Ditto, with Chemicals .	4	4	0
Third Size ditto, with Achromatic Lens .	5	5	0
Ditto, ditto, with Chemicals, &c. .	7	7	0
Daguerreotype Camera, complete with Apparatus and Chemicals for portraits and small views . . £6 6 0 and	10	10	0

Larger sizes made to order.

Mercury Boxes, 15*s.* and £1 : 1*s.* each.

Iodine Boxes, 5*s.*, 7*s.* 6*d.*, and 10*s.* 6*d.* each, according to size and fittings.

Glasses for Bromine Solution, from 5*s.*

Buff Sticks for cleaning Silver Plates.

Boxes for holding Silver Plates.

Plate-holders, with clamp for fastening to table.

Achromatic Lenses of all sizes.

Camel Hair Brushes for Calotype, 1*s.* each.

Tin, Pewter, and Glass Vessels for heating Calotype paper, from 2*s.* 6*d.* each.

Brass Spirit Lamps, with sliding ring, 7*s.*

Glass ditto, plain, 2*s.*, 3*s.*, 4*s.*, and 5*s.* each.

Glass Measures, from 1*s.* 6*d.*

Scales and Weights, with glass pans, 18*s.*, 21*s.*, and 42*s.*

White Blotting Paper, 1*s.* 6*d.* per quire.

Frame and Plate Glass, for Photographic Drawing, from 5*s.* each.

Glass Pestles and Mortars, from 2*s.* 6*d.*

— Stirring Rods, from 3*d.*

— Funnels, for filtering solutions.

CHEMICALS.

		s.	d.
Pure Nitrate of Silver, crystalized	per ounce	5	6
— Iodide of Potassium		2	0
— Bromide ditto		5	0
— Gallic Acid, crystalized		12	0
— Muriate of Ammonia		0	6
— Hyposulphite of Soda, crystalized		1	0
— Chloride of gold		5	0
— Iodine		1	6
— Ditto, very superior		2	6
— Chloride ditto		5	0
— Bromine		5	0
— Prepared Tripoli		1	0
— Lamp Black, prepared		1	0
— Glacial Acetic Acid		2	0
— Ferrocyanate of Potass		0	6
— Pyroligneous Æther, for spirit lamps	per pint	2	0

— Pure Nitric Acid, *4d.* per ounce.

— Distilled Mercury, *6s.* per lb.

— Iodized Paper, *1s.* and *2s. 6d.* per packet.

— Photogenic Paper, *1s.* and *2s. 6d.* per packet.

Cook & Co., Printers, 76, Fleet Street.